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CLAIMS

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1	1. A vertical cavity surface-emitting laser comprising:			
2	a device structure, having a height z and an aperture, including			
3	an active layer having an upper and lower surface, and			
4	upper and lower distributed Bragg reflectors on the upper and lower			
5	surfaces of the active layer and adjacent thereto;			
6	contacts for applying a voltage across the active region; and			
7	a light emission property that varies within the aperture and the light output is in			
8	spatially fixed modes.			

- 2. A vertical cavity surface-emitting laser, as defined in claim 1, wherein the light emission property is the Fabry-Perot wavelength.
- 3. A vertical cavity surface-emitting laser, as defined in claim 1, further comprising a non-planar layer within the device structure, positioned at height x, where $0 \le x < z$, between heights x and z, the light emission-property is a refractive index that varies in the plane perpendicular to the light output.
- 4. A vertical cavity surface-emitting laser, as defined in claim 3, wherein the refractive index has a lengthscale on the order of the lasing wavelength.
- 5. A vertical cavity surface-emitting laser, as defined in claim 3, further comprising a substrate having a first side adjacent to the lower distributed Bragg reflector.
- 6. A vertical cavity surface emitting laser, as defined in claim 5, further including a texturing layer interposing the substrate and the device structure, wherein the non-planar layer is the texturing layer.

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7. A vertical cavity surface-emitting laser, as defined in claim 6, wherein the texturing layer is patterned.

- 8. A vertical cavity surface-emitting laser, as defined in claim 5, wherein the non-planar layer is a layer within at least one of the upper and lower distributed Bragg reflectors.
- 9. A vertical cavity surface-emitting laser, as defined in claim 5, wherein the layer within at least one of the upper and lower distributed Bragg reflectors is patterned.
- 1 10. A vertical cavity surface-emitting laser, as defined in claim 5, wherein non-2 planar layer is a first surface of the substrate adjacent the lower Bragg reflector.
- 1 11. A vertical cavity surface-emitting laser, as defined in claim 10, wherein the first surface is patterned.

12. A vertical cavity surface-emitting laser, as defined in claim 3, wherein the non-planar layer introduces a phase mismatch in the device structure.

- 13. A vertical cavity surface-emitting laser, as defined in claim 12, wherein the non-planar layer is a layer within at least one of the upper and lower distributed Bragg reflectors.
- 1 14. A vertical cavity surface-emitting laser, as defined in claim 13, wherein the layer within at least one of the upper and lower distributed Bragg reflectors is patterned.

5033 1 15. A vertical cavity surface-emitting laser, as defined in claim 3, further comprising a planarizing plane-within the device structure, positioned at height y, where x<y<z.

16. A vertical cavity surface-emitting laser, as defined in claim 15, between heights x and y, the refractive index varies in the plane perpendicular to the light output.



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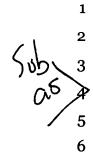
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- 17. A vertical cavity surface-emitting laser, as defined in claim 15, wherein the refractive index has a lengthscale on the order of the lasing wavelength.
- 1 18. A vertical cavity surface-emitting laser, as defined in claim 15, further comprising a substrate having a first surface adjacent to the lower distributed Bragg reflector.
 - 19. A vertical cavity surface-emitting laser, as defined in claim 18, further including a texturing layer interposing the substrate and the device structure, wherein the non-planar layer is the texturing layer.
 - 20. A vertical cavity surface-emitting laser, as defined in claim 19, wherein the texturing layer is patterned.
 - 21. A vertical cavity surface-emitting laser, as defined in claim 19, wherein the non-planar layer is a layer within at least one of the upper and lower distributed Bragg reflectors.
 - 22. A vertical cavity surface-emitting laser, as defined in claim 18, wherein the layer within at least one of the upper and lower distributed Bragg reflectors is patterned.
- 23. A vertical cavity surface-emitting laser, as defined in claim 18, wherein nonplanar layer is a first surface of the substrate adjacent the lower Bragg reflector.
- 24. A vertical cavity surface-emitting laser, as defined in claim 23, wherein the first surface is patterned.
- 25. A vertical cavity surface-emitting laser, as defined in claim 15, wherein the non-planar layer introduces a phase mismatch in the device structure.

fabricating electrical contacts for applying a voltage across the active layer.

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32. A method for manufacturing a vertical cavity surface emitting layer comprising the steps of:

depositing a lower distributed Bragg reflector;

depositing an active layer;

depositing an upper distributed Bragg reflector having a texturing layer; and

fabricating electrical contacts for applying a voltage across the active layer.